

Flightcell Iridium Modem



Installation Manual

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www.flightcell.com

Section 1: Revisions & Approvals

Version	Date	Author	Change Note Number	Description
1.0	2 nd November 2016	J. Glasgow	FCN0708	Initial release.
2.0	3 rd January 2019	J. Glasgow	#HW516	Removed references to USB and RS485.
3.0	19 th August 2022	JJ Booyse	HW-2147	New release
4.0	28 th October 2022	JJ Booyse	HW-2224	Removed Reset Reference

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CONTENTS

Section 1: Revisions & Approvals.....	2
Section 2: Introduction	4
Section 3: Flightcell Iridium Modem Specifications.....	5
Section 4: Components required for installation	6
Connectors and fasteners	6
Antenna	6
Section 5: Installing the Flightcell Iridium modem.....	7
Mounting the modem	7
Wiring the modem.....	7
Guidelines for fabricating the wiring harness	8
Guidelines for the antenna cable.....	8
Section 6: Setting up your modem	9
Connecting to the Iridium network	9
Configuring your DZMx to work with the modem	9
Using the Modem Standalone	9
Installing a SIM card.....	9
Section 7: Warranty and contact details	10
Limited warranty for your Flightcell Iridium Modem.....	10
Section 7: Documentation and Information.....	11
Contact Details.....	11
Mailing Address	11
Physical Address.....	11
Appendix 1: Wiring and installation drawings	12

Section 2: Introduction

The Flightcell Iridium Modem is a robust modem designed specifically for installation with a DZMx or as a standalone modem. The modem supports Iridium voice, SMS, SBD and data services.

If the modem is installed with a DZMx, the DZMx controls the modem and provides audio integration into the aircraft ICS/audio panel.

The modem must be installed with an appropriate external Iridium antenna. Several antenna options are available from Flightcell International.

Section 3: Flightcell Iridium Modem Specifications

Flightcell part number		MOP_00010	
Material		Faceplate and backplate - diecast Type 380 Aluminium with Black Powder Coat finish	
		Extrusion - 6063 Aluminium with clear anodized finish	
Input voltage		12-32 V DC	
Power supply current		Maximum current - 500mA @ 28V	
RF Frequency Range		1616MHz - 1624.5MHz	
Average RF TX Power	During a TX slot (max)	7W	
	During a frame (typ.)	0.6W	
RF RX Sensitivity		-118dBm	
Max cable loss ¹		3dB	
Max Antenna gain		3dBi	
MIC audio	Input	Fully Differential - 50mVrms to 1Vrms Nominal 775mVrms	
	Input impedance	600Ω	
SPK audio	Output	Fully differential - Up to 1Vrms into 150 Ω Nominal 775mVrms	
	Output impedance	600Ω	
Data connection		RS-232 - RTS/CTS Flow control only.	
Weight		240 grams	8.5 oz
Dimensions	Width	62mm	2.44"
	Height	33.9mm	1.35"
	Depth	144mm	5.67"
Main connector		DA-15F	
Antenna connector		TNC	
Certification		DO160G Sections: 20 RF Susceptibility), 21 (EMI)	

The total implementation loss for antenna, connectors, cable and any other RF components between the modem and the antenna should not exceed 3dB.

Section 4: Components required for installation

Connectors and fasteners

The modem is connected to a wiring harness which is in turn is connected to a Flightcell DZMx (or a PC/embedded device).

Following are the terminating connectors and fasteners used with the modem.

Connectors		
	Main connector	M24308/4-2F (DA-15 Male)
	Antenna connector	TNC
Fasteners		
	4 x M4 screws or bolts sized to fit mounting surface	

Antenna

The Flightcell Iridium Modem requires an antenna installed on the top of the aircraft, or in a location with a clear view of the sky (for standalone installations), mounted as close to horizontal as possible. The following should be considered when determining a mounting location on an aircraft:

- » Maintain good separation from other antennas. Preferred separation is 750mm from L-band (GPS), TCAS or transponder antennas, but a lesser separation can be applied if there is limited space on the aircraft.
- » On a helicopter, the antenna can be installed below the rotor blades, but avoid installing it close to the rotor hub, as the hub and inner rotor can block the antenna's view of the sky.
- » Keep coax cable lengths short to minimize attenuation of transmit and receive signals.

Iridium antenna cables must be selected to keep signal loss within accepted levels. Total signal loss on the Iridium connection between the DZMx and the antenna should not exceed 3dB at 1645MHz.

Following are recommended Flightcell antennas. These can be used on an aircraft or stand alone.

These can be obtained from Flightcell International or your authorised Flightcell dealer.

Antenna	Application	Part number
Dual Flat Antenna L1 GPS/Iridium BNC/TNC TSO Cert	Where both Iridium and GPS are required	ANP_00043
Single Flat Antenna Iridium TNC White TSO Cert	Iridium only	ANP_00045

Section 5: Installing the Flightcell Iridium modem

Mounting the modem

The modem should ideally be located close to the DZMx (if installed with DZMx), preferably where it is reasonably readily accessible to enable easy access to the SIM card.

Appendix 2 includes drawing references for a dimensioned drawing of the modem, showing mounting details.

Wiring the modem

The data and audio connections should be made as per the wiring diagrams referenced in Appendix 1.

Modem pin	Function	
1	DC in	Power
2	Audio from Sat Lo	Output
3	Audio to Sat Lo	Input
4	Ground	GND
5	RS-232 RTS	Input
6	RS-232 CTS	Output
7	Not used	-
8	Not used	-
9	Ground	Ground
10	Audio from Sat HI	Output
11	Audio to Sat HI	Input
12	Not used	-
13	RS-232 RXD	Input
14	RS-232 TXD	Output
15	Ring indicator	Output

Guidelines for fabricating the wiring harness

For aviation applications, all wiring should be carried out with aviation specification fireproof cable.

Screened cable should be used where indicated in the wiring diagrams. Where cable screen connections are not explicitly shown, they should be left unterminated.

The following minimum wiring specification is recommended:

- » Power supply - 22 AWG (0.325mm²)
- » Other cabling - 24 AWG (0.205mm²).

Guidelines for the antenna cable

The antenna and associated cabling should have a nominal impedance of 50Ω with a maximum attenuation of 3dB over the cable run. Following are the recommended cables specifications.

Cable Length	Cable Specification
Up to 3m	RG58C/U or RG400
Up to 6.5m	LMR200 or RG142A/U-9006 cell foil
Up to 8m	RG213
Up to 17m	LMR400
Up to 26m	LMR600

Section 6: Setting up your modem

Connecting to the Iridium network

The Flightcell Iridium modem operates on the Iridium satellite network. To enable connectivity an Iridium SIM card provisioned for the desired services is required. The SIM can be obtained from your preferred Iridium service provider.

Configuring your DZMx to work with the modem

Your DZMx will need to be configured to use the Flightcell Iridium Modem. Instructions for configuring a DZMx to work with the modem can be found in the Installation Manual for the DZMx. These manuals are available from the Flightcell support page at <https://www.flightcell.com/resources>.

Using the Modem Standalone

If the modem is to be used in standalone mode it will need to be connected to a PC (or embedded device) which can control the internal Iridium transceiver directly. The Iridium modem uses the Iridium 9523 transceiver.

The modem provides analogue audio and RS232 data. For RS232 the default data rate is 19200 baud, 8 bits, 1 stop, no parity. RTS/CTS flow control is optionally available when using RS232.

The RS232 connects directly to the Iridium 9523 modem allowing operation through the use of AT commands. See the Iridium ISU AT Command Reference for the full set of AT commands and responses.

Installing a SIM card

The Flightcell Iridium Modem will not register on a network until a valid SIM card with a current account is installed.

The DZMx will provide an error message if either there is no SIM card installed, or there is an invalid SIM installed. Please see the Installation Manual for your DZMx for more details on error messages.

If the modem is standalone, the connected device will need to interrogate the modem via the AT interface to determine the SIM / network registration status.

To install the SIM card:

- » Remove the rubber plug in the end of the modem.
- » Insert the SIM card in the slot and press till it clicks into place.
- » Reinsert the rubber plug.

The correct orientation of the SIM card is with the gold contacts down, and with the end of the card with the diagonal cut-out inserted first. The SIM card will not fully insert in the wrong orientation.

Section 7: Warranty and contact details

Limited warranty for your Flightcell Iridium Modem

Flightcell International Ltd.'s quality products are proudly designed and manufactured to the highest standards in New Zealand.

Your Flightcell Iridium Modem is warranted for one year from date of sale.

The warranty is void if any labels are removed or if it is determined that your modem has been:

- » Connected to a power supply delivering more than 32 Volts.
- » Connected with reverse polarity.
- » Installed in direct contravention to the guidelines outlined in the installation manual.
- » Physically damaged, or a fault has occurred due to the product being used beyond what is considered normal use, causing unusual deterioration of the product.

If the product is deemed to be faulty or in need of repair, please contact Flightcell International Ltd to obtain a Returned Materials Authorization or download from <https://www.flightcell.com/support>

Section 7: Documentation and Information

Comprehensive documentation for the Flightcell Iridium Modem is available on the Flightcell website <http://www.flightcell.com/resources>.

Contact Details

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Appendix 1: Wiring and installation drawings

Wiring diagrams and mechanical drawings are available on the Flightcell website <https://www.flightcell.com/resources>.

Interconnect drawings for DZMx & Standalone installations:

- » 114-00021 - Flightcell Iridium Satellite Modem DZMx interconnect drawing
- » 114-00022 - Flightcell Iridium Satellite Modem standalone interconnect drawing

Mechanical drawings:

- » 115-00013 - Flightcell Iridium Satellite Modem General Arrangement Drawing